REMARKS/ARGUMENTS

In response to the Office Action mailed January 13, 2009, Applicants amend their application and request reconsideration. Claims 1-31 are pending in this patent application but only claims 13-16 are under examination due to a species election requirement and an election.

In this Amendment an unnecessary paragraph is removed from the specification. In addition, the four examined claims are amended to describe the invention in more detail.

The patent application describes four embodiments of the invention with respect to Figures 1-4 of the patent application. In general, claims 13-16 correspond to the respective, described embodiments. Each of the four independent claims includes four nearly identical initial paragraphs. The fourth paragraph is amended to describe the location of the materials quality sensor as downstream from at least one of the heater, the processor, and the cooler. Further, the materials quality sensor is described as including a laser that produces light incident on the metallic material being processed in the manufacturing line. The laser light excites ultrasonic waves that propagate through the metallic material. Characteristics of these ultrasonic waves are determined by an interference measurement made between the incident light and the reflected portion of the incident exciting light. This feature of the invention is supported by the description in the patent application at page 21.

Claim 13 now ends in four paragraphs, the final paragraph of which includes a portion of the original language of claim 13. These paragraphs describe the calculation of influence coefficients that indicate the mathematical influence of the heater, the processor, and the cooler on the quality of the metallic material that is being manufactured using the apparatus. The calculation of influence coefficients is described in the patent application at pages 23-28. Further, correction gains of the respective controllers are calculated based upon the responsiveness of those

controllers and upon weighting factors that reflect the degree of influence of the respective controllers on the material quality. See, again, pages 23-28 of the patent application. Finally, based upon a calculated error, i.e., the difference between the quality data measured and the target quality data, incorporating the influence coefficients and weighting coefficients, the data setting calculation means is adjusted with respect to the operation of the heater, the processor, and the cooler, upstream of the point where data is gathered for calculating the quality of the metallic material. By adjusting the upstream control settings, the error can be reduced so that the metallic material produced in the manufacturing line has specifications meeting the target quality data. See the patent application at pages 28-30.

Claim 14 is modified with respect to the description of the materials quality sensor employing exciting laser light to produce ultrasonic waves that are, in turn, used to determine the quality of the metallic material. Other minor amendments are made in claim 14 for the purpose of clarity. Similarly, claim 15 is amended principally with respect to the exciting laser light feature of the materials quality sensor.

Independent claim 16 is amended in a way similar to claim 13. However, claim 16 includes five paragraphs at the end, rather than the four final paragraphs of claim 13. In the apparatus of claim 16, influence coefficients are calculated by the respective correction means from data gathered at a material quality control point that is downstream from a material quality measuring point. In addition, influence coefficients reflecting changes in heating, processing, and cooling are calculated using the quality model at the material quality control point. See the patent application at pages 45-47.

Claims 13-15 were rejected as anticipated, pursuant to 35 USC 102(e), by Plocoennick et al. (Published U.S. Patent Application 2006/0117549, hereinafter Plocoennick). This rejection is respectfully traversed.

Plocoennick is not prior art to the present patent application pursuant to 35 USC 102(e). That publication is the publication of a U.S. patent application based

upon an international patent application, PCT/EP03/12918, filed November 19, 2003. The international patent application was published as WO/002004050923 on June 17, 2004 in the German language. Therefore, according to 35 USC 102(e), Plocoennick has, as its effective date for prior art purposes, the date of its publication, June 8, 2006. That date is well after the effective filing date of the present patent application, which is the filing date of the international patent application upon which the present patent application is based. That international filing date is October 14, 2004, about 1.75 years before the effective date of Plocoennick. If the Examiner intends to rely upon Plocoennick further, then a different legal ground for the citation must be devised.

If Plocoennick were prior art, it could not anticipate any of claims 13-16.

With respect to claims 13 and 16, there is no discussion in the brief disclosure of Plocoennick concerning (i) the calculation of influence coefficients or anything of a similar nature, (ii) the calculation of correction gains for each of the controllers, based on their respective control response and transfer times, or (iii) the calculation of weighting coefficients for weighting adjustments of the different controllers, based upon their respective influences, to produce a metallic material having the target quality. Because of these differences, if prior art, Plocoennick could not anticipate either of claims 13 and 16.

With respect to claim 14, Plocoennick fails to describe the learning feature of the neural network, preventing anticipation, even if Plocoennick were prior art to the present patent application. Moreover, to the extent Plocoennick describes some kind of error correction technique in the cited paragraph [0016]-[0018], the quantities measured, grain size in Plocoennick, and used for learning calculations are different from the quantities measured and controlled in the claimed apparatus. The claimed apparatus is much simpler and the complexity of the calculations required in the Plocoennick apparatus preclude its reasonable industrial application.

In the apparatus according to claim 15 the materials quality model computing means estimates, using a materials quality model, the quality of the metallic material

at a point in the manufacturing line located downstream with respect to the materials quality sensor. By contrast, in Plocoennick, control is exercised with respect to a point upstream of the material quality measuring point, the opposite of the arrangement of the apparatus of claim 15. Therefore, even if Plocoennick were prior art to the present patent application, Plocoennick could not anticipate claim 15.

Claims 13-16 were also rejected as anticipated by Shimomura (JP 4-361158).[1] This rejection is respectfully traversed.

As a fundamental point, there is no description in Shimomura concerning determining material quality by exciting the metallic material with a laser beam that induces ultrasonic waves and, thereafter, measuring the characteristics of the ultrasonic waves to determine material quality. For that basic reason, Shimomura cannot anticipate any claim now presented.

Reconsideration and allowance of claims 13-16 are earnestly solicited.

Respectfully submitted,

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[1] The Examiner referred to this publication as Fujioka but the English language abstract suggests that the first inventor is Shimomura, the name used here, rather than Fujioka who is listed as the fourth inventor.